

NASA TECH BRIEF

Marshall Space Flight Center



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Metabolic Balance Analysis Program

The problem:

To plan for life support consumables requirements and waste removal by analyzing the diet proposed. The specific diet determines the quantity of food required to supply the necessary metabolic energy, the quantity of water needed to reconstitute the dried foods and provide supplementary body requirements, the amount of oxygen required to support metabolism, and the amount of carbon dioxide generated. These factors in turn determine the quantities of other body wastes generated.

The solution:

A computer program which calculates the pertinent parameters. A proposed 28-day diet is analyzed, and the results are presented in part as an example of the program's application.

How it's done:

The total energy consumed is accounted for by equations representing the breakdown of foodstuffs into carbohydrates, fats and proteins. These energy equations are modified to account for the digestive materials and indigestible crude fibers present in each unit of foodstuff. Equations are also formulated to simulate the following functions: digestive efficiency, intestinal flow, vitamin and mineral needs, water intake, solid waste losses, and respiratory exchange ratio.

This program has possible applications in biological research and education, extended manned space programs, and other life support analysis programs. Potential diets can be analyzed and the results used to verify conformance of diet to specifications, adequacy of diet for supplying needed metabolic energy, and life support consumables and waste management requirements.

Notes:

1. This program is written in FORTRAN IV for use on the CDC-6500 computer system.
2. Requests for further information may be directed to:

COSMIC
112 Barrow Hall
University of Georgia
Athens, Georgia 20601
Reference: B71-10384

Patent status:

No patent action is contemplated by NASA.

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